5 **(a)** Rewrite the following pseudocode algorithm using a `WHILE … DO … ENDWHILE` loop.

```
INPUT Num
FOR Counter ← 1 TO 12
      Num ← Num * Counter
      A[Counter] ← Num
NEXT
```

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(b) Explain the differences between a `WHILE … DO … ENDWHILE` and a `REPEAT … UNTIL` loop.

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.....[4]

4 Five data types and five data samples are shown below.

Draw a line to link each data type to the correct data sample.

Data type	Data sample
Integer	'a'
Real	2
Char	2.0
String	True
Boolean	"Twelve"

[4]

5 Explain the difference between a variable and a constant in a program.

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.....[2]

6 Identify **three** different loop structures that you can use when writing pseudocode.

1 .....

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2 .....

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3 .....

.....[3]

4 Four programming concepts and four examples of programming code are shown below.

Draw a line to link each programming concept to the correct example of programming code.

Programming concept	Example of programming code
Counting	`Sum = Sum + Value[n]`
Repetition	`IF Value = 10 THEN PRINT 'X'`
Selection	`FOR Counter = 1 TO 10`
Totalling	`Amount = Amount + 1`
	`Sum = Num1 + Num2`

[4]

5 **(a)** Write an algorithm, using pseudocode and a `FOR ... TO ... NEXT` loop structure, to input 1000 numbers into an array.

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.....[2]

(b) Rewrite your algorithm using another loop structure.

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.....[4]

3 A program will be written to store information about members of a swimming club.

The following membership details will be recorded:

- Name
- Gender
- Status:
  - Senior
  - Junior
- Fee
- Team member (Yes or No)

(i) Choose a suitable data type for each of the membership details to be recorded.

Membership details	Data type
Name	
Gender	
Status	
Fee	
Team member	

[5]

(ii) The swimming club has 50 members.

State the data structure that would be most suitable to use and give a reason for your choice.

Data structure.....

Reason.....

.....[2]

5 `REPEAT ... UNTIL` is one type of loop structure.

Identify and describe **two** other types of loop structure that you could use when writing pseudocode.

Loop structure 1.....

Description.....

.....

Loop structure 2.....

Description.....

.....[4]

4 Four statement types and four examples are shown below.

Draw a line to connect each statement type to the correct example.

Statement type	Example
Assignment	`FOR X ← 1 TO 10`
Iteration	`READ X`
Input	`PRINT X`
Output	`X ← Y + Z`

[3]

5 A programmer writes a program to store a patient's temperature every hour for a day.

State the data structure that would be most suitable to use and give the reason for your choice.

Data structure .....

Reason.....

.....[2]

6 Identify **two** different selection statements that you can use when writing pseudocode.

1 .....

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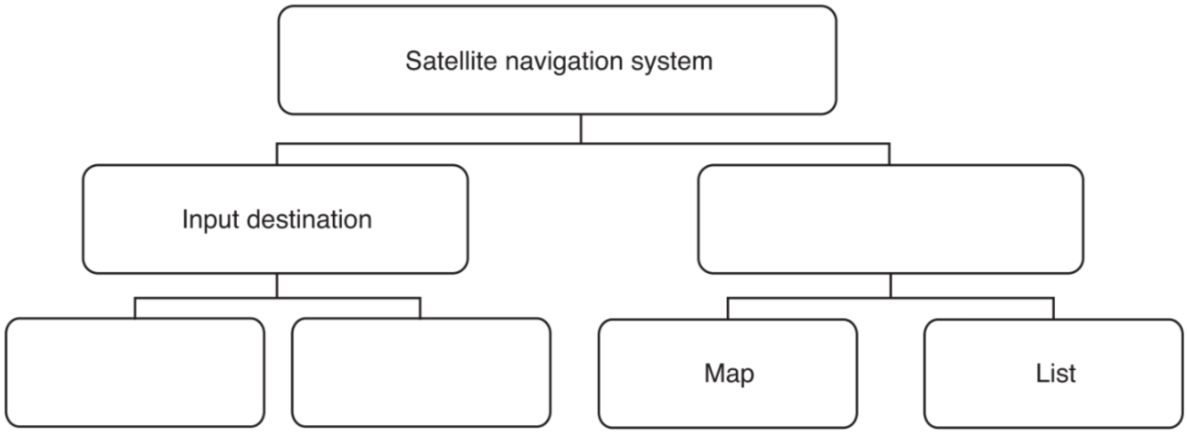
2 .....

.....[2]

3 A satellite navigation system works using destination details entered by the user, either a new destination or chosen from previously saved destinations. The satellite navigation system will then output directions to the destination in the form of either a visual map or a list of directions.

A satellite navigation system is an example of a computer system that is made up of sub-systems. This structure diagram shows some of its sub-systems.

Complete the diagram by filling in the empty boxes.



[2]

5 **(a)** Describe the purpose of each statement in this algorithm.

```
FOR I ← 1 TO 300
  INPUT Name[I]
NEXT I
```

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.....[2]

(b) Identify, using pseudocode, another loop structure that the algorithm in **part (a)** could have used.

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.....[1]

(c) Write an algorithm, using pseudocode, to input a number between 0 and 100 inclusive. The algorithm should prompt for the input and output an error message if the number is outside this range.

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2 **(a)** Write an algorithm to input three different numbers, and then output the largest number. Use **either** pseudocode **or** a flowchart.

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(b) Give **two** sets of test data to use with your algorithm in **part (a)** and explain why you chose each set.

Test data set 1 .....

Reason .....

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Test data set 2 .....

Reason .....

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[4]

4 An algorithm has been written in pseudocode to input 100 numbers and print out the sum. A `REPEAT ... UNTIL` loop has been used.

```
Count ← 0
Sum ← 0
REPEAT
  INPUT Number
  Sum ← Sum + Number
  Count ← Count + 1
UNTIL Count > 100
PRINT Sum
```

(a) Find the error in the pseudocode and suggest a correction.

Error.....

Correction .....

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[2]

(b) Rewrite the correct algorithm using a more suitable loop structure.

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.....[3]

4 A routine checks the weight of melons to be sold in a supermarket. Melons weighing under 0.5 kilograms are rejected and melons weighing over 2 kilograms are also rejected.

Give an example of each type of test data for this routine.

Normal .....

Extreme .....

Abnormal .....[3]

5 Identify **two** different conditional statements that you can use when writing pseudocode.

1 .....

2 .....[2]

4 A routine checks the age and height of children who are allowed to enter a play area. The children must be less than 5 years of age and under 1 metre in height.

(a) The first set of test data used is age 3 and height 0.82 metres.

State what type of test data this is.

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Give a reason for using this test data.

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.....[2]

(b) Provide **two** additional sets of test data. For each, give

- the type of each set of test data
- the reason why it is used

Each type of test data and reason for use must be different.

Set 1 .....

Type .....

Reason .....

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Set 2 .....

Type .....

Reason .....

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.....[6]

5 `REPEAT ... UNTIL` and `WHILE ... DO ... ENDWHILE` are two different loop structures you can use when writing pseudocode.

Explain, using examples, why you would choose to use each type of loop.

Example 1 .....

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Reason for choice .....

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Example 2 .....

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Reason for choice .....

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.....[6]

4 `IF ... THEN ... ELSE ... ENDIF` and `CASE ... OF ... OTHERWISE ... ENDCASE` are two different conditional statements that you can use when writing pseudocode.

Explain, using examples, why you would choose to use each conditional statement.

Example 1 .....

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Reason for choice .....

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Example 2 .....

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Reason for choice .....

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..... [6]

4 **(a)** **Four** pseudocode descriptions and **five** pseudocode statements are shown. Draw one line to link each pseudocode description to the correct pseudocode statement. Not all pseudocode statements will be used.

Pseudocode description	Pseudocode statement
A loop that will iterate at least once.	FOR…TO…NEXT
A conditional statement to deal with many possible outcomes.	IF…THEN…ELSE…ENDIF
A loop that will iterate a set number of times.	WHILE…DO…ENDWHILE
A conditional statement with different outcomes for true and false.	CASE…OF…OTHERWISE…ENDCASE
	REPEAT…UNTIL

[4]

(b) Write an algorithm in pseudocode, using a single loop, to print 50 names that have been stored in an array.

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2 Write an algorithm using **either** pseudocode **or** a flowchart, to:

- input a positive integer
- use this value to set up how many other numbers are to be input
- input these numbers
- calculate and output the total and the average of these numbers.

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3 The following diagram shows **four** data structures and **four** descriptions.

Draw a line to connect each data structure to the correct description.

Data structure	Description
Constant	A collection of related data
Array	A value that can change whilst a program is running
Table	A value that never changes whilst a program is running
Variable	A series of elements of the same data type

[3]

4 `IF ... THEN ... ELSE ... ENDIF` is one type of conditional statement used when writing pseudocode.

Identify and describe **another** type of conditional statement that you could use when writing pseudocode. Give a reason why you would use this type of conditional statement.

Conditional statement .....

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Description .....

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Reason .....

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[4]